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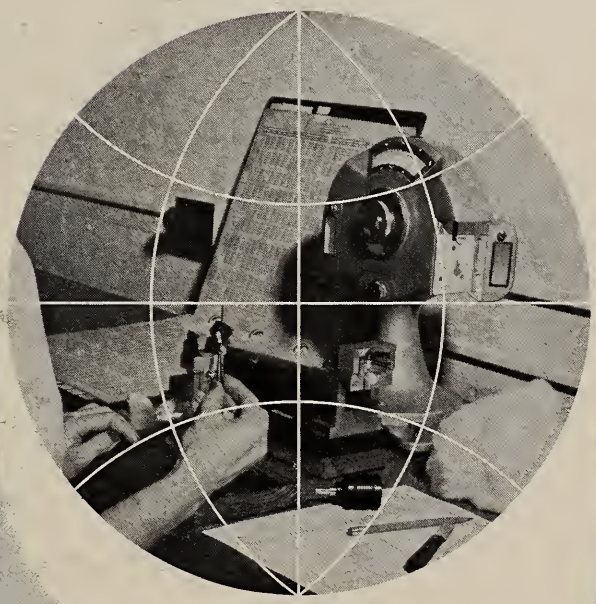

A GLOBAL SERVICE FOR COTTON TESTING

UNITED STATES DEPARTMENT OF AGRICULTURE/AGRICULTURAL MARKETING SERVICE

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Cover Page

A total of 791 laboratories in 49 countries are using AMS-administered standards for the calibration of their cotton testing instruments. The international cotton industry uses these standards to make sure that their instruments accurately measure the fineness, maturity and strength of cotton fibers. Although USDA grades and standards often cross national boundaries, forming an international language in the marketing of agricultural products, the international calibration cotton standards are perhaps AMS' most international service.

Editor, MILTON HOFFMAN
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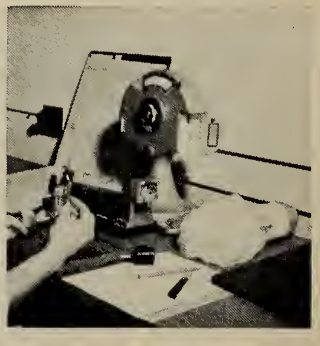

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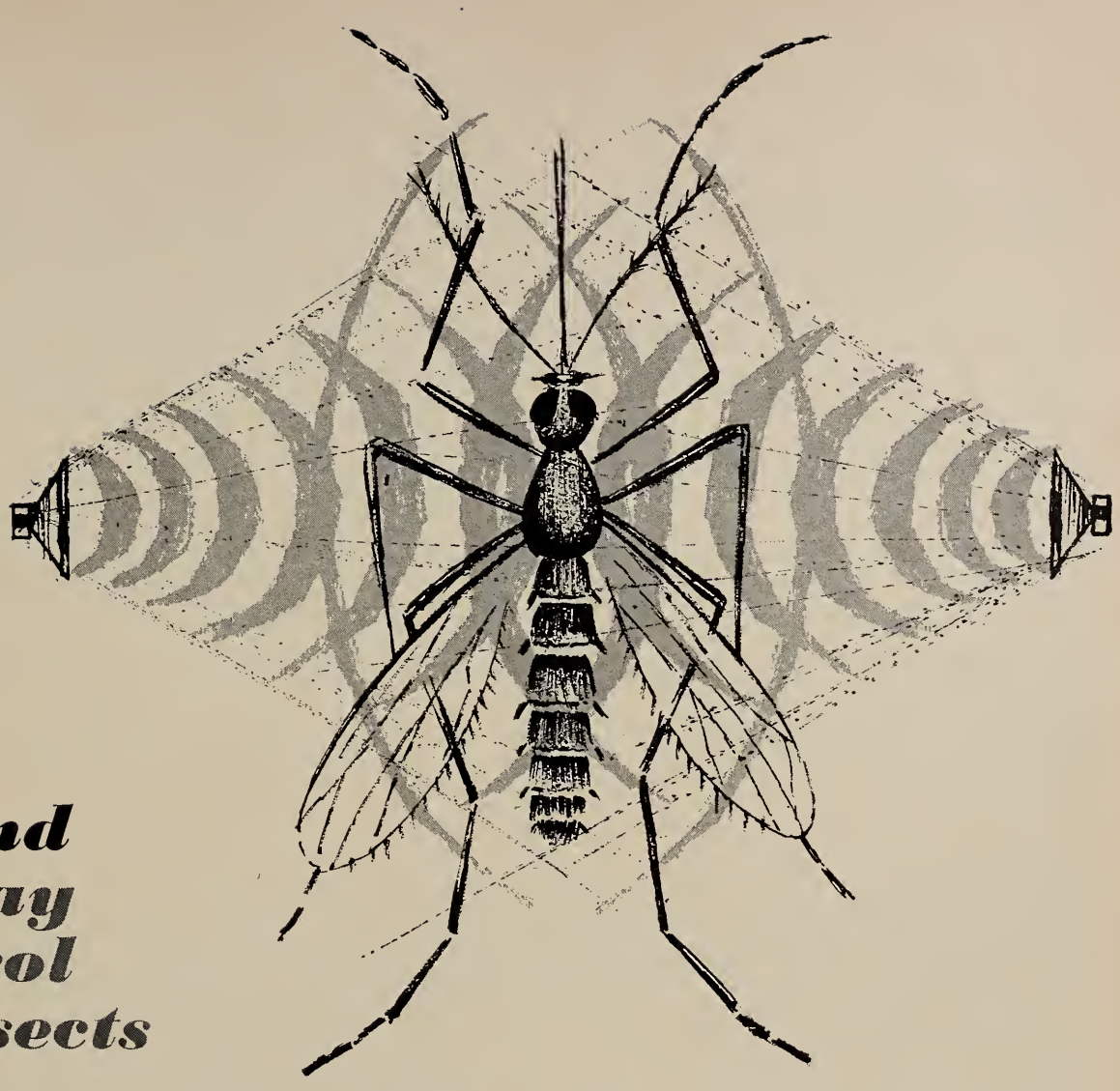


sound may control insects

SCIENTISTS of the U. S. Department of Agriculture are investigating the use of amplified sound as a possible non-chemical means of controlling stored-product insects that attack grain and other farm products during the marketing process.

The idea was developed by Robert Kirkpatrick, an entomologist stationed at the Savannah, Ga., Stored-Product Insects Laboratory of the USDA's Agricultural Marketing Service. Kirkpatrick noticed that amplified sound waves seemed to keep flies and mosquitoes away from his backyard patio. He decided to test under laboratory conditions the effect of sound waves on common pests of stored foods.

In exploratory tests at Savannah, Kirkpatrick released Indian-meal moths (*Plodia interpunctella*), a common pest of stored foods, in a small chamber in which two radio loudspeakers faced each other. The speakers provided a continuous low hum, barely audible to humans.

The moths were exposed to the sound waves for four days while they were laying eggs. Only about one-fourth as many moths developed from these eggs as developed from eggs laid by moths not exposed to sound. Those that did develop took longer to become adults, and of them nearly half died the first day. Normally, these moths live for several weeks, laying eggs continually during their life span.

Curiously, of the moths that did survive to lay eggs, a smaller percentage of the eggs they laid hatched than would be expected from moths without a family history of treatment with sound. In four experiments, the results were almost the same each time, according to Kirkpatrick.

AMS scientists feel that use of sound has considerable promise as a non-chemical method for controlling insects that attack stored products. They are interested in further investigating whether use of amplified sound may not only upset reproductive patterns and processes of the insects exposed to it, but may also have a carryover effect upon the second generation. They hope that further tests in this area of marketing research will show whether control of insects can be achieved; just what kinds of sound are most useful for the purpose; and how sound can be used as an insect preventative in food storage, handling, and processing areas.

PRODUCE WAREHOUSEMAN—

Is Your Loading Out Method Efficient?

By Arnold L. Lundquist

ARE LOADING out methods in your produce warehouse as efficient as they should be? To put the question another way, are your shipping methods the *best* for the firm's average order? Is your firm getting an adequate return for time and equipment invested in its handling facilities? What is your cost per ton to assemble merchandise and load out delivery trucks with fresh fruits and vegetables?

Research teams of the U. S. Department of Agriculture's Marketing Service are constantly looking for ways to improve the American marketing system, thereby reducing costs of moving food products to consumers. This searching has recently been directed at assembly and loading out operations for produce in affiliated food distribution and service wholesale warehouses.

Research findings were confined primarily to costs of labor and materials-handling equiment. Influence of order size on labor productivity was also measured.

Today's modern produce warehouse is either (1) part of a full-line distributive facility in which other food operations are also conducted, or (2) an independent operation where only fresh fruits and vegetables are handled.

The AMS research study was made in warehouses representative of these two types to compare costs of the most productive methods. The *slot system* uses a towtractor pulling one or two 4-wheel trucks to select merchandise from slots in the storage area, and to move the orders to the loading dock. Later the selector trucks are pushed into a delivery truck and packages are stacked in predetermined load sequence. Another system uses a *short, motorized-belt conveyor* and a transcribing machine to load out with a 2-man crew, and low-lift platform trucks with dead skids to assemble merchandise. Assembly areas on the dock hold the merchandise until it is selected into customer orders by a belt loader, who listens to orders recorded on the transcriber belt.

The slot system was least costly for large volume full-line food wholesalers, and the short motorized-belt conveyor system was least costly for fruit and vegetable service wholesalers. "Least costly" in this context applies to tangible costs of labor and materials-handling equipment only. All wholesalers handled the same varieties and container sizes of fresh fruits and vegetables and loaded out approximately equal daily volumes.

Order size was a vital factor in this determination. For the firm using the slot system, orders averaged slightly less than 67 packages. For the firm using the short motorized-belt conveyor, orders averaged slightly more than 14 packages. Cost curves plotted on a line graph intersected at an order size of 37 packages. Therefore, for orders greater than 37 packages the slot system proved least costly, and for orders of 37 packages and less, the short motorized-belt conveyor system proved least costly.

A third system uses a *long, motorized belt conveyor* and a checker to load out with a 6-man crew, and a forklift truck operator and 2 jacklift operators to assemble merchandise from storage. This system had total costs lower than the slot system for orders smaller than 27 packages, but had higher costs than the short motorized-belt conveyor system for all order sizes.

(*The author is a marketing specialist in the Transportation and Facilities Research Division of AMS*).

The "slot system" was found least costly for full-line distributors having orders for more than 37 packages. This system uses an order selector with a towtractor and two selector trucks to transport orders from storage area and load them onto delivery trucks.

The "short motorized-belt conveyor system" above was least costly for servicing fruit and vegetable wholesalers having orders of 37 packages and less. Produce is loaded onto truck. A third system uses a "long, motorized-belt conveyor" and checker to load out with a 6-man crew. A forklift operator below and 2 jacklift operators assemble produce from storage.

A Global Service for Cotton Testing

MARKETING of agricultural products never quite stops at the national border. Exports accounted for roughly a third of our cotton crop over the last four years and are important for our entire agricultural economy.

Official grades and standards often cross national boundaries—forming an "international language" in the marketing of agricultural products.

But perhaps the most international of the many services provided by the Agricultural Marketing Service of the U. S. Department of Agriculture is the International Calibration Cotton Standards Program, administered by the Cotton Division for the five sponsoring organizations—American Textile Manufacturers Institute, the American Cotton Shippers Association, the International Federation of Cotton and Allied Textile Industries, the National Cotton Council of America and the U. S. Department of Agriculture.

At present, these standards—which serve as checking types for the calibration of cotton testing instruments—are in use by 791 laboratories in 49 countries. They are used by cotton merchants, manufacturers, and others to assure that their instruments accurately measure the properties of the cotton being bought, sold, or consumed.

The standards are prepared in half-pound rolls of actual cotton and give a definite measurement of two fiber properties of cotton which are important in manufacturing: fineness and maturity of cotton fibers (for air-flow instruments) and the strength of cotton fibers (for the Pressley strength tester).

The program started in 1956 after approval by all sponsoring organizations, but actual distribution of standards did not begin until 1957, with only three standards available. The remaining six have been added since.

What gave rise to the project was the growing importance of fiber tests in the merchandising and processing of cotton and in evaluation of research studies. By 1956 many of the domestic and foreign cotton mills were including specifications in their contracts for several fiber property measurements.

Although fiber test methods, such as the micronaire and strength tests, are scientific in principle, the measurements in actual practice are subject to a certain amount of variability among instruments and operators. It became necessary, therefore, to use calibration cotton standards to maintain a consistent and accurate level of test results for different instruments within a labotory as well as among different laboratories.

In an effort to solve this need, several organizations (including USDA) developed check or calibration cottons for use by the industry. Since none of the check cottons were accepted universally, different laboratories sometimes obtained entirely different results on fiber tests, depending on which calibration cotton was used. The International Calibration Cotton Standards Program was established to remedy this situation.

Participation in the International Calibration Cotton Standards Program has been increasing each year since its inception. The nearly 800 participating laboratories purchased 2,484 samples in 1963, and purchases are expected to exceed 3,000 samples in 1964.

Nine calibration cotton standards are available from USDA for four types of cotton: American Upland, American Egyptian, Asiatic and Egyptian. Six standards are for American Upland, and one each for the other types.

An extra coarse bale of Asiatic cotton is undergoing tests now for a new standard—which will calibrate the upper portion of the micronaire scale on air flow instruments. If this proposed new standard is accepted by the International Calibration Cotton Standards Committee, sufficient standards will then be available to calibrate the entire micronaire scale from 2.4 to 8.0.

The micronaire scale measures the resistance of cotton to the passage of air. Coarse cotton permits more air to pass through and receives a high micronaire reading. Fine cotton, however,

offers resistance to air and receives a lower reading. This might be equated with alternately forcing water through a nozzle filled with sand and then with marbles. Marbles, like the coarse cotton fibers, would allow the water to flow through quite freely. But sand, like fine cotton fibers, would not. The cotton most desirable for the spinner is that in the medium range, neither too fine nor coarse.

Each of the sponsoring organizations has designated a specific laboratory to represent its organization in establishing standard values for the Calibration Cotton Standards. These laboratories are located in the United States, England and Germany.

Uniform samples of cotton selected at random from a carefully selected bale are tested by the five designated laboratories to determine if the bale is suitable for calibration purposes. If the test values obtained by these laboratories are in close agreement and show the bale to be very uniform for the fiber properties tested, the average value obtained by the laboratories becomes the standard value for that particular calibration cotton standard.

After a bale of cotton has been approved for a calibration cotton standard, it is packaged into half-pound rolls and the label on each roll shows the standard test values.

Laboratories purchasing the standards use them in the following manner:

1. Most laboratories test one or more specimens of the calibration cottons before they begin their testing of samples to determine if their results are on the proper level. If the results they obtain on these specimens are not the same as the established value of the calibration cotton, the operators adjust their instruments and technique to obtain the established values before they begin testing. These laboratories also test specimens of the calibration cottons periodically during the day to determine if instruments are maintaining a consistent level of testing.

2. Some laboratories control their level of performance by applying correction factors to test results on the basis of control tests carried out simultaneously on the calibration cottons. For example, an operator might take the difference between the actual reading on the standard cotton and what the reading should be (as noted on the label) and apply it to the cotton being tested.

Also a part of the program is a semi-annual check-test service available to any laboratory which purchases the calibration standards. Under this service, participating laboratories are given check-test samples every six months—to test and return the results to the Cotton Division for evaluation. A report of each check test is furnished to each participating laboratory. This report shows whether the results reported were within the acceptable limits, and how they compare with the results obtained by the designated laboratories and all participating laboratories.

More than 400 laboratories now participate in the check-test program.

Basically a technical program, the calibration standards service utilizes international cooperation, promotes the use of American cottons abroad and aids the cotton industry the world over in providing orderly and efficient marketing of cotton.

Variability among instruments that test cotton fiber, such as the airflow instrument at right, and others, led to the standards, which bring consistency and accuracy to test results at laboratories throughout the world.

A New Cottonseed Sampler

By R. T. Doughtie, Jr. and M. E. Whitten

THE LOW roar of vacuum cleaners so familiar to the ears of homemakers may soon be heard at cottonseed oilmills and wherever samples are taken for grading cottonseed. A new pneumatic sampler that's a huskier version of the household vacuum cleaner has recently been approved by the U.S. Department of Agriculture as an alternate method for taking official samples of cottonseed.

The National Cottonseed Products Association and the American Oil Chemists' Society have also endorsed the new sampler. The sampler is now commercially available.

The pneumatic sampler is faster, safer, and provides a more representative sample than standard trier instruments now in use, according to tests made with several hundred truckloads of both clean and "bolly" cottonseed at commercial sampling sites at Memphis, Tenn., and Lubbock, Texas. The tests were made by cottonseed processors under the supervision of the Cotton and Market Quality Research Divisions of the Agricultural Marketing Service of USDA. The American Oil Chemists' Society, consulting engineers, and manufacturers also participated in the tests.

The sampler works like household vacuum cleaners, although it has a larger hose and a more powerful motor to provide a strong suction. Proper operation of the new device requires little experience or training.

When a truckload of cottonseed pulls up, the person operating the sampler climbs on top of the load with an aluminum tube used in probing the cottonseed. Attached to the probe is a long, flexible hose leading to a tank where the sample is collected.

The operator makes gentle up-and-down motions with the probe until it reaches the floor of the truck. Seed and foreign material are rapidly sucked through the probe and tube into the tank. A cyclone blower mounted on top of the tank supplies the suction to draw the samples.

Representative samples of cottonseed are much easier to obtain with the new sampler than with present samplers because the new device takes top-to-bottom samples in all truckloads. In contrast, the widely-used trier usually does not go to the bottom of a truckload of cottonseed. A trier is a 4- to 5-foot long corkscrew-like device which bores through the cottonseed to obtain samples. Many of the longer triers are power-driven because of the difficulty of driving them into the cottonseed.

Another reason why more representative samples are obtained by the new sampler is because all the seed taken in each probe by the pneumatic sampler goes into the sample container. When a trier is used, part of the seed is often dropped when the contents of each probe is transferred from the trucks.

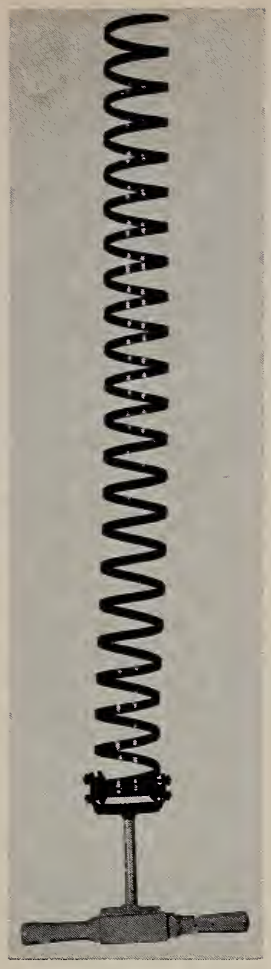
Little difference in percentage of foreign material was found between samples taken from power-driven triers and with the pneumatic sampler, in the tests. The effects of air suction on moisture content of the seed was also negligible.

A large truckload of cottonseed could be sampled in less than 2 minutes with the pneumatic sampler. A power-driven trier would take about 7 minutes for the same load. In a typical test with a 17-ton truckload of cottonseed, the new sampler made five probes yielding a 33-pound sample in only 1 minute and 45 seconds.

Two-pound samples are required per ton of cottonseed, under approved procedures for taking samples with the pneumatic sampler. A sample of the required size could be quickly obtained by as few as three probes in a small truckload of cottonseed.

Greater safety is another important advantage of the pneumatic sampler over a power-driven trier. Lifting a probeful of tightly packed or extra moist cottonseed sometimes results in wrenched muscles when a trier is used. More serious injuries sometimes occur if the trier becomes entangled in the chains used in some trucks to hold the sides together. These hazards are not present when a pneumatic sampler is used because suction substitutes for muscles, and there are no revolving parts in the new device to come in contact with chains hidden in the load of seed.

The new sampler, which was developed by a commercial firm, operates



on the same principle as a sampler for pea beans developed earlier by marketing researchers of the U.S. Department of Agriculture at Beltsville, Md. Another device similar in many ways to the new cottonseed sampler has been developed for use with peanuts by marketing researchers at the Raleigh, N.C., station of the Market Quality Research Division, in cooperation with North Carolina State University (see *Agricultural Marketing,* April 1962). The pneumatic peanut sampler is now in wide commercial use.

The cottonseed sampler costs less than the peanut sampler, because the cottonseed sampler has simpler construction features. The model for peanuts has a revolving probe, a more complicated airflow pattern, and is supported by steel girders on overhead rails.

Although the cottonseed sampler used in the AMS tests was stationary, it could be constructed as a portable unit, with any length of hose required for good flexibility. A 2½ inch wide probe and hose gave an ideal size sample, and included foreign material of various sizes that might be present in the seed. Tests showed that probes and hoses with wider diameters gave samples that were too large.

Details for sampling cottonseed, including use of the pneumatic cottonseed sampler, are given in a revised publication, "Approved Methods for Drawing, Cleaning, Preparing, Sealing, and Certificating Official Samples of Cottonseed." Copies may be obtained from Cotton Division, AMS, USDA, Washington, D. C. 20250.

(*Mr. Doughtie is a member of the AMS Cotton Division, stationed in Memphis, Tenn. Mr. Whitten is a member of the Market Quality Research Division, stationed in Washington, D. C.*)

The new pneumatic cottonseed sampler at left operates like a vacuum cleaner. The operator below stands on a truckload of cottonseed and makes gentle up-and-down motions with the 8-foot aluminum probe. Sucked up seeds are blown through the flexible tube to a tank mounted on the wall of the shed. The sampler's predecessor, above, (also available with a motor) corkscrews into cottonseed.

Market Facts For Produce Men

By Jack Saylor

IF EXPERIENCE is the best teacher, then the annual summaries of fresh fruit and vegetable shipments and unloads published by USDA's Agricultural Marketing Service are about the best textbooks a produce man could have.

They're capsule collections of the produce industry's experience for a year, and they'll help you plan for next year. They can tell you where to get rutabagas in July, and when rhubarb is plentiful. They tell you where Washington State's apples went last year, and how Florida celery traveled to market. In short, these little history books have the story on the vital supply half of that old law of supply and demand.

Take "Fresh Fruit and Vegetable Unload Totals for 41 Cities," AMS-25 (1963). This publication has just been revamped to make it even more useful. It used to be called the "100 Cities" report, because it reported unloads in 100 cities around the country. But for 59 of those cities, the only figures available were *rail* unload totals. With trucks hauling more and more fresh produce, those rail-only figures came to mean less and less. So this year, the report carries only the figures for the 41 cities where data on both rail and truck unloads are collected. Since these 41 cities take an estimated 60 percent of the fresh fruits and vegetables marketed in the United States, they furnish an excellent supply barometer.

The new report is also set up by commodities instead of by cities, to make it more useful — especially for shippers and sales managers.

Suppose you are a grower or shipper of apples from the State of Washington. Instead of having to go through the tables for all 41 cities and add up the apple unloads, you can just turn to page 49 and they're listed by city, State of origin and mode of transportation—already totaled.

This table will give you a picture of your distribution pattern, as well as your competition's. In Chicago, for example, Washington supplied nearly 50 percent of the 3100 cars unloaded. Michigan supplied another 961 cars, with New York shipping in 266 cars and Ohio 271 cars. Clearly, you're competing principally with Michigan for the Chicago market. In Detroit, Washington supplied 418 out of 1183 cars against the 628 coming from within the State. In Buflalo, N.Y., however, the picture isn't so bright; only 46 out of 481 cars were supplied by Washington. Almost all the rest came from within New York State.

The report will also tell you a lot about your marketing effectiveness. For instance, the first set of tables shows unloads in 41 cities by commodities, origins and months. It shows that the peak month for apple shipments was October, with 6139 cars unloaded in the 41 cities. Washington furnished 1729 cars—about 28 percent of the supply during that period of heavy supplies and relatively low prices. But by April, when unloads were down to 3747 cars and prices were higher, Washington was furnishing about 52 percent of the supplies. The same table tells you that the chief competition for the 41 markets in April comes from New York State and Michigan.

If you are a buyer in one of the markets, instead of a seller at shipping point, then you can use AMS-25 (1963) as a guide to sources of supply. Take green peppers, for instance. In December, you can get supplies of peppers from Florida (336 cars were unloaded in the 41 cities in December last year), Texas (452 cars), California (76 cars) or Mexico (36 cars). In September your choice is a lot broader. In the 41 cities reported, peppers were received from more than 30 States last September, and 7 of these supplied more than 50 cars that month. Take your pick.

Another very useful annual summary is "Fresh Fruit and Vegetable Shipments," AMS-41 (1963). This one sums up the rail shipments of fresh produce by commodities, from every State, county and waybilling station, plus data on truck shipments for those States where they are available.

If you want your unloads sorted out by cities rather than by commodities, the Fruit and Vegetable Market News Service offers four annual summaries of produce unloads by cities:

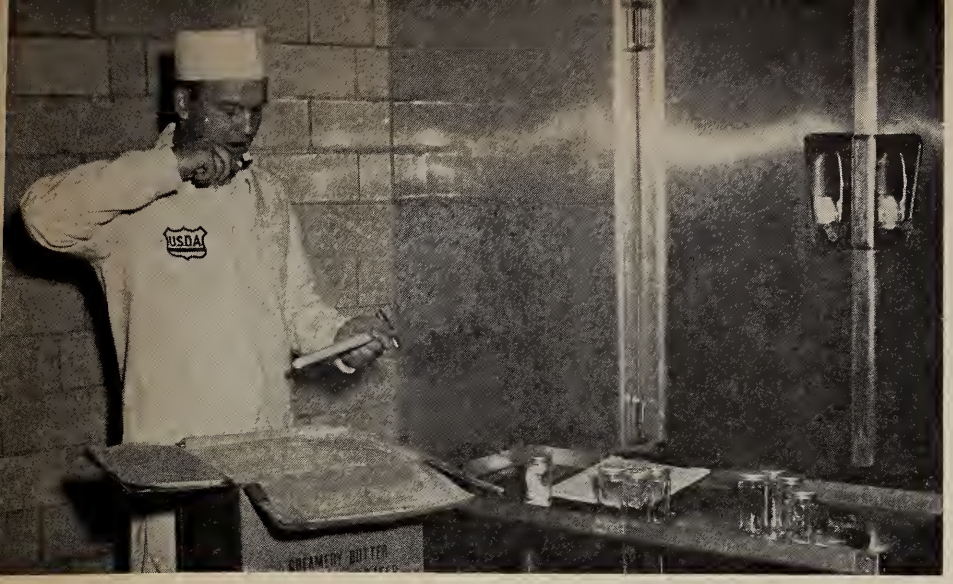
Fresh Fruit and Vegetable Unloads for Eastern Cities (AMS 427); for Southern Cities (AMS 493); for Midwestern Cities (AMS 492); and Western Cities (AMS 428).

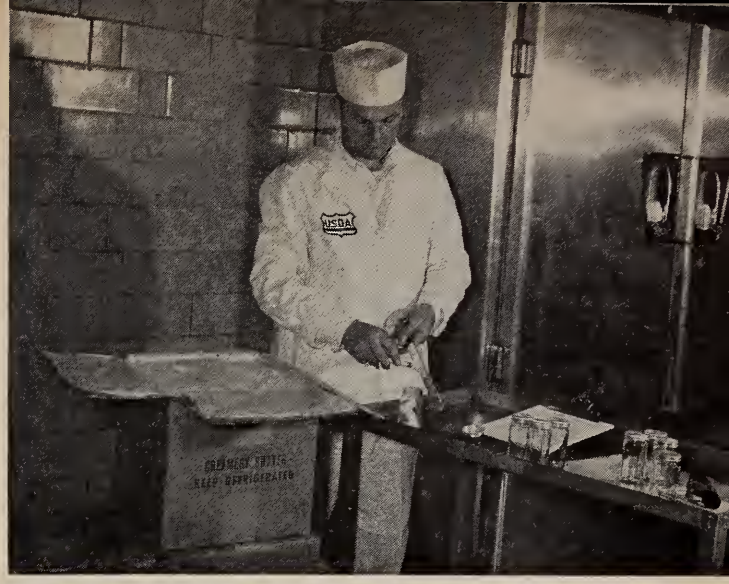
All of the annual summaries are an additional service of the Fruit and Vegetable Market News Service, which is responsible for gathering price and supply information daily on fruit and vegetable crops.

You can get single copies of any of these publications free of charge by writing to Marketing Information Division, Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C. 20250.

For a produce man, they're the next best thing to a photographic memory.

(*The author is in charge of transportation reports in the Fruit and Vegetable Market News Service, AMS.*)





Left, in grading butter, flavor—determined by taste and aroma—is given greatest consideration. Also considered are body, texture, and color. Top quality rates U.S. Grade AA. Right, a grader places samples of butter into sterile jars to be placed in incubators for tests on keeping quality. Good results mean the butter will maintain its fine flavor.

Applying Butter Grades Uniformly

NO MATTER where or when you buy butter, you and other food shoppers over the country can be assured of a product with the flavor, aroma, texture and color that suits your needs.

That assurance is given in U. S. Department of Agriculture's butter grades, backed up by nationally uniform standards which provide the "yardstick" for determining the official quality grade—U. S. Grade AA, A, B, or C.

Mounting automation in marketing has had little effect on the method used to assign these grades to butter. Grading butter — because of the nature of the product—is still largely a subjective process and an art that requires precision. The official grader must judge butter by his senses of taste, smell, touch, and sight—then weigh in his mind how it compares with the uniform grade standards.

It's not enough to have uniform standards. They must be *applied* uniformly too. The 129 Federal and 26 Federal-State graders, stationed in various plants and markets around the country, must make like judgments as to whether a butter sample has a desirable smooth creamy texture, good spreadability, uniform color, highly pleasing flavor and aroma, and so on.

Thus the reason for licensing of graders, for close supervision, and constant training.

USDA's Agricultural Marketing Service, which operates the Federal and Federal-State grading services, has rigid requirements for employment in grading and a well-organized program for "refreshing the minds" of graders and grading supervisors.

One becomes a butter grader only if he has had at least four years practical experience in dairy manufacturing, or specialized college training and an additional year of experience.

Then he serves an apprenticeship under the direction of an experienced grading supervisor until he has demonstrated his proficiency in applying the U. S. grade standards. A butter grading license goes only to those graders who show consistent, unbiased, and accurate butter grading ability.

Review training sessions are held twice a year for grading supervisors and supervisory graders. These are followed by refresher courses for butter graders, held throughout the country. Every butter grader attends at least one course—often more—each year.

In the refresher course, butter graders compare and review representative samples of all grades of butter from various sections of the country. Grading procedures and application of the standards are stressed, and a proficiency test is given at the end of each session. Experts in the national AMS dairy grading office participate in these training sessions to assure that the grading standards are being applied uniformly among areas.

And in addition to the "refresher" schooling, area supervisors and supervisory graders continually check on the proficiency of each individual butter grader.

Since butter grading is subjective, honest difference of opinion may occasionally arise on "borderline" churnings of butter. The difference may be between two graders, it may be between the grader and the user of the voluntary grading service, or there may be dissatisfaction on the part of a buyer of officially graded butter.

The Agricultural Marketing Service recognizes this fact, and provides for appeal grading and reinspection by an area supervisor or representative of the national office. However, few calls are made upon this provision.

Last year, 825 million pounds of butter were graded according to U. S. standards—56 percent of the total production. Of this amount, graders designated 72 percent U. S. Grade AA, 20 percent U. S. Grade A, 7 percent U. S. Grade B, and 1 percent U. S. Grade C and below grade.

Of the total, 220 million pounds — under about 500 brand names — were labeled with the shield-shaped U. S. grade mark stating the grade, to give food shoppers recognizable assurance of dependable quality.

WHY GRADES AND GRADING

By Willard F. Williams

GRADING simply is a process of classifying units of a commodity into groups according to established and generally accepted criteria. The reasons for doing so are numerous.

Many of the official grade standards were introduced originally to facilitate the collection and dissemination of public information on prices and marketing conditions and to improve the accuracy of such information. More recently grade standards have, to some degree, been forced upon producers and marketing firms by discriminating demands of consumers and detailed specifications of manufacturers, processors and retailers. Grade standards often provide a mechanism for use in advertising, promotional and mechandising programs. They are used as a vehicle in volume control, quality control, and supply management programs. Grades and grading often introduce an added degree of convenience in buying and selling.

The question "Why" centers attention upon the nature and incidence of economic effects associated with grades and grading. We want to know what a grading system can be exected to accomplish.

While economic effects must depend upon many factors, there seems to be some general agreement that standardized or uniform systems of grading usually are consistent with the general economic or welfare interests of the majority of those concerned.

The principal objectives in grading are to increase buyer satisfaction, reduce marketing costs and improve returns to producers. Theoretically, everyone benefits. These lofty objectives, we assume, are achieved primarily through two different avenues. The first is improvement in the physical or operating efficiency of the marketing system. The second is improvement in pricing accuracy and effectiveness or, in other words, through improved pricing efficiency.

As for the first means of achieving these objectives, a marketing system is operationally efficient if costs of performing each particular marketing service or function are reduced to a minimum. Theoretically, at least, standardized systems of grading can have beneficial effects on operational efficiency by:

(1) Increasing the extent of buying and selling by description. (2) Encouraging the sale of products in uniform graded lots. (3) Eliminating time and expense associated with arguments regarding quality.

(4) Increasing the market potential of suppliers previously operating on a local or regional basis and permitting them to sell most advantageously in the national market.

(5) Widening the procurement territory of large volume processors, wholesalers and retailers and permitting them to buy most advantageously from among a larger number of suppliers.

(6) Encouraging specialization among suppliers and marketing firms by function, type of product handled, and type of outlet.

(7) Affecting the location of production and processing and encouraging the shift of these functions to areas offering production cost advantages.

(8) Reducing the pressure among suppliers for large expenditures on competitive brand advertising.

(9) Increasing the emphasis upon technological innovation, improved marketing practices and other means of reducing costs.

Now for the second means of achieving the principal objectives of grading — improvements in pricing accuracy and efficiency.

A pricing system tends to be efficient when accurate prices are established immediately and distributed quickly at relatively low cost. There seems to be some general agreement that, theoretically, a standardized grading system can improve pricing efficiency by:

(1) Providing a universal and generally accepted language by which differences and variations in attributes of quality can be interpreted readily by consumers and the trade alike.

(2) Increasing accuracy in the process of price formation through improved knowledge and increasing the level or degree of competition on a price basis.

(3) Providing a framework by which consumers, retailers and others are assisted in selecting from among quality or grade differences the particular qualities or grades most desired at prevailing prices.

(4) Increasing or improving the efficiency with which desires and preferences of consumers are transmitted through the marketing system to producers.

(5) Facilitating collection of accurate information on demand, supplies available, and prices.

(6) Facilitating the dissemination of marketing information in a more meaningful, understandable, and useful form.

IN a competitive system, supply-demand forces are in operation irre-

spective of the existence of a Federal grading system. Nevertheless, these forces theoretically are permitted to operate more precisely and effectively when quality differences are specified than when they are not.

For instance, with grades fixed and unchanging in terms of physical attributes of a commodity, price differences between grades should shift and change in accordance with supply-demand changes among the grades.

In a particular supply situation a relative increase in consumer demand for a particular grade should tend to result in a relative increase in the price of that grade not only at the retail level but at the producer level.

Accordingly, producers will have received a signal from consumers to increase production of that particular grade. Alternatively, under fixed conditions of demand, an increase in the supply of a particular grade will be a signal to consumers to increase consumption of that grade and a signal to producers to cut production of the grade.

In addition to providing a universal language, a uniform grade system tends to (1) increase the general level of knowledge concerning prices and supply or demand conditions of all persons in the trade — consumers, trades people, processors and producers—and (2) equalize the level and degree of knowledge between buyers and sellers.

The significance of these effects stems from indications that a free marketing pricing system functions more effectively if both parties in buying and selling transactions are well informed concerning grades and qualities of the commodity being traded than if they are uninformed or unequally informed.

So grading, it seems, leads to lower marketing costs and ensures the degree of competition necessary to push these savings on through the marketing system to the consumer or back to the producer. Producers benefit through higher prices, a larger volume of consumption, or both. Consumers benefit through lower prices and additional assurance that the product will meet their requirements.

What then, we might ask, are the minimum requirements of a grading system that seeks to attain such objectives and effects?

Grading normally is not justified unless an *economic basis* for it is found. Such a basis requires quality *attributes* (tenderness, flavor, etc.) that are important to a significant number of consumers in terms of significant differences in prices they are willing to pay. It requires a significant degree of variation among units of the commodity in these attributes as found, normally, in agricultural commodities.

Finally, an economic basis requires a situation in which the attributes cannot be determined readily and accurately by consumers and other buyers at the time of purchase in the *absence of grades*. Thus, no grading system is needed to distinguish between red and yellow apples.

In addition to a basis for grading, the minimum requirements call for (1) reasonably accurate *indicators* of eating, wearing or use quality, and (2) adequate measures of variation in the quality indicators.

WHAT does all this mean in terms of simple, everyday language? To say that a basis for grading exists is to say that as a result of physical differences in the commodity the individual buyer is willing to pay a significantly higher price for some units than for others.

It does not require all consumers or other buyers to think alike. Some may prefer a certain combination of attributes in a product; and units with preferred characteristics, so far as these buyers are concerned, represent highest quality. Units with quite different characteristics may represent highest quality to others.

In short, a basis for grading may exist even though all buyers do not agree that some particular grade is best, another second best, and still another third best for all buyers and all uses. Such a basis requires only that grades should tell buyers that the quality represented by one grade is *different* than the quality represented by another grade.

The need for reliable indicators of hidden attributes of quality often presents serious problems. Criticism arises when there is a low correlation between indicators such as marbling in beef (the distribution of fat through lean meat) and quality attributes such as tenderness.

Quality variation within grades and overlapping of quality between grades also are sources of criticism and of confusion and misunderstanding. In agricultural products quality varies according to variations in each of numerous physical characteristics.

It is seldom possible to consider all of these characteristics as grade determining criteria. The several attributes and related indicators selected seldom are perfectly correlated with one another. This means that some quality variation within grade and some overlapping in quality between grades frequently must be accepted as inevitable.

The minimum requirement in this respect is met if the variation within grade is smaller than the overall variation in the commodity. The smaller variation increases the probability that consumers will be satisfied with their selection. In addition, a significant difference should exist between grades in the range of variation covered.

Those grades which do not result in a smaller variation or cover the same range of variation as another grade are not useful "working" grades. But this does not mean, necessarily, that the entire system is useless.

Many problems attributed to grading lie in how they are used rather than in the grade standards themselves. In order to attain stated objectives, the grades must be reflected through the marketing system, to consumers if possible, and used. Any misuse tends to reduce effectiveness, thus, the purposeful adulteration of higher quality wheat to meet minimum "dockage" requirements, a frequent practice, tends to defeat the basic purpose of grading.

Finally, an important fact should be recognized. A grading system, almost necessarily, is a compromise. The specification of quality within predictable limits apparently is the principal requirement of any effective grading system. The smaller the variation the more effective and useful the system becomes.

IN agricultural products, however, the range of quality variation within grade is reduced primarily by increasing the number of grades. Normally, however, there is some practicable limit to the number of grades that can be included in any grading system. In addition, direct and indirect costs of grading must be lowered accordingly, as grading nearly always represents a compromise between minimizing quality variation and the cost and inconvenience of doing so.

All of these considerations call for a continued program of education and of both physical and economic research directed toward improvements in grade standards. At the same time, they suggest that so long as a system of grading meets minimum requirements, emphasis should be placed constructively upon improvements rather than upon efforts directed toward destruction of existing standards.

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Quantity Food Buyers Can Control Quality

By Sebastian Filippone and Bryan Killikelly

A PASSENGER on a steamship heading for Europe sits down to a meal a thousand miles from shore in the Atlantic Ocean.

An employee of an American oil company in the Middle East goes into a company-operated supermarket to buy groceries.

A soldier in a United Nations emergency force patrolling some trouble spot halfway around the world lines up for a chicken dinner.

An employee in the New York City headquarters of a large company has his lunch in the company cafeteria.

All the people in these incidents, and many others like them every day, have one thing in common — some of the food they will eat has been inspected and certified as meeting desired specifications under a U.S. Department of Agriculture program.

Food buyers for such large and diverse institutions have a built-in problem. How can they explain to their suppliers exactly what they want, and then be sure the suppliers understand and will take pains to see that each item in the quantity order meets the specifications?

USDA's Agricultural Marketing Service is helping many firms solve this problem with a service which enables them to maintain more precise control over the quality of the food they buy for use in their meal-serving programs.

This service is operated by the Fruit and Vegetable, Livestock, Poultry, Dairy, and Grain Divisions for their respective commodities. The name varies—for meats and poultry it's called "acceptable service"; for fruits and vegetables it's called "inspection service"; and for dairy and grain products, there is no special name, but the service is offered under the respective grading and inspection services.

The program is designed especially to assist food buyers obtain large quantities of food products tailored to meet their specific demands. It is available to food buyers for schools, hospitals, restaurants, steamship lines, governmental agencies or institutions and other mass quantity purchasers. The food acceptance service can be used in purchasing fresh and processed fruits and vegetables, meats and meat products, poultry and eggs, dairy products, some grain products and related commodities, such as wheat flour, cornmeal, salad oil, dry edible beans, dry peas and milled rice.

The program works this way. The food buyer for a company cafeteria knows how much food he must buy to meet menu needs, and he knows the size, kind, quality, and other requirements of the food he wants to best serve the purposes of the cafeteria.

The first part is relatively easy, through use of commonly understood weights and measures. The second part is more difficult, since the buyer must translate the other requirements into meaningful terms so he can pass them on to his suppliers. These other requirements can include storage characteristics, special sizing to meet individual serving needs, factors aimed at minimizing waste in preparation, and so on. The buyer must then make certain the product he accepts meets his special requirements.

AMS food experts, at this point, enter the picture by helping the buyer set forth his requirements in clearcut, meaningful terms, employing official USDA grades or using specifications drawn up to meet the buyer's specific needs. The buyer then can either contract with a supplier to provide the food or call for bids from several suppliers. The contract he eventually signs with his supplier provides that all deliveries be examined by an AMS inspector, and officially "certified" or "accepted" as meeting the buyer's specifications.

The inspector examines the food before delivery to see that it meets the specifications, and seals and stamps each package. The buyer, when he accepts delivery, can then be assured that each stamped package contains exactly what he had in mind when he placed his order.

The system varies slightly according to the characteristics of various commodities, but operates in essentially the same manner for most food products.

The food acceptance service is used by different institutions for different reasons. Steamship lines, for instance, have certain requirements which differ from those of restaurants and other land-based establishments which have ready access to food supplies.

United States Lines is a prime user of the service for much of the meat, poultry, fruit, and vegetables it serves

Some of the food eaten by emergency United Nations forces has been certified as meeting specifications under USDA's acceptance service.

on its passenger ships crossing the Atlantic Ocean. These foods are examined to make sure they meet the company's specifications before they are served to passengers aboard the United States, fastest passenger liner in the world, and her sister ship, the America.

Another large steamship line which uses the service is Moore-McCormack Lines. Al Gartland, purchasing manager for the company, recently contracted to have 125,800 pounds of Choice grade beef cuts accepted by USDA on the basis of specifications prepared by the company. This is in addition to lamb, pork, and provision items such as ham and bacon, all of which are examined under an acceptance service contract.

The Cunard Steamship Line, when provisioning the Queen Mary and its other ships, insists on different degrees of maturity in fruits and vegetables purchased for voyages. Percy G. Lambert, assistant catering superintendent, explains it this way:

"Beyond our requirements that all food served aboard ship must be wholesome and of the best quality, we're concerned with the problem of possible spoilage or uneconomical use of refrigerating space. To avoid the dilemma, we require that half of certain purchases, such as soft fruits and tomatoes, must be firm ripe, and the balance hard to firm. By the time the firm ripe items are consumed, the hard to firm have ripened and are ready for eating."

Phillip G. Courtney, purchasing superintendent, says Cunard uses the acceptance service extensively "primarily because it offers an almost ironclad guarantee that we'll get only those foods which meet our specifications. Having your people, who are specialists in each particular food line, is very reassuring to us."

Shelf life of food products is important to many large food buyers. The Arabian American Oil Company, one of the early users of the AMS acceptance service, uses it extensively for such items as celery, specified portions of poultry, and red meats, with specifications on fat trimming to reduce transportation costs en route to its 15,000 employees in Saudi Arabia.

"The Acceptance service takes a big job off our hands by inspecting for the specifications we demand," says Lyman L. Walbridge, food buyer for the company.

Another user of the service for food destined for overseas consumption is the United Nations. Troops of the UN emergency forces in various trouble spots of the world consume large quantities of poultry and eggs from the United States—all graded and checked to see that UN specifications are met.

"We're glad to avail ourselves of USDA's grading and acceptance services," says Denis Casey, procurement officer. "They eliminate any concern we might otherwise have about the quality and specifications of our purchases."

The cafeteria in the New York City headquarters of the Metropolitan Life Insurance Company serves an average of 17,000 meals a day, seven days a week. Donald R. Hill, commissary manager, describes the acceptance program as "good insurance for consistency in the quality and specifications we must have."

An AMS inspector makes sure that a sack of onions meets specifications before they are loaded on the Queen Mary.

Preventing waste in food is a particularly vexing problem to many government agencies. The people fed in such public facilities as hospitals, prisons, welfare agencies, schools, and homes for the aged vary widely in physical condition, age, and appetite.

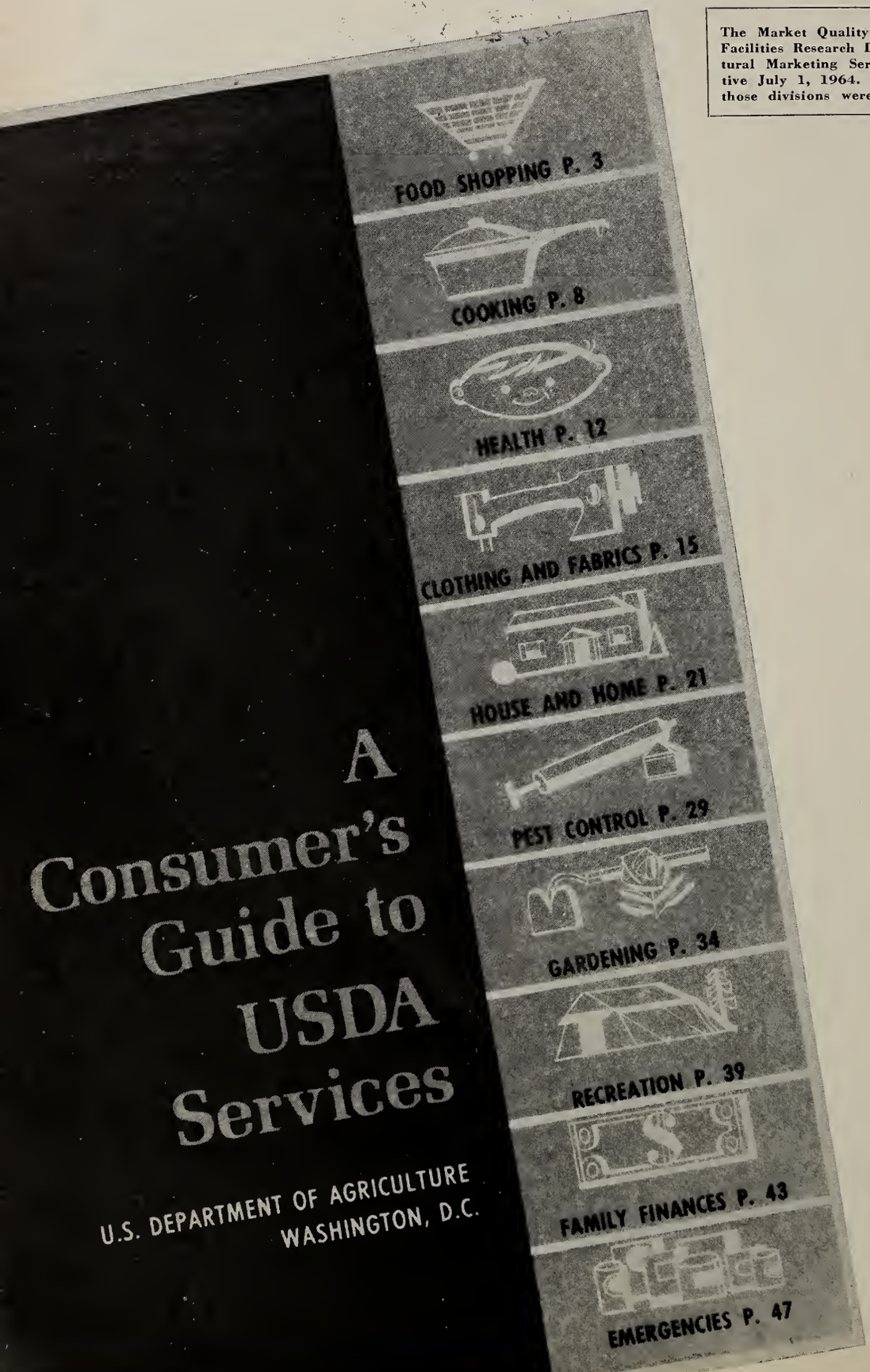
"Avoiding waste is fundamental with us," says Edward J. Hetherington, principal purchasing inspector for the controller of New York City. For instance, he said, "we know the size apple the average school child will eat. We know what size grapefruit will yield the portion best suited for patients in our hospitals.

"In short, we want the best possible deal we can get for the taxpayers' money. Your acceptance service does an A-Number One job in helping us with our problems. It's been a good investment for us."

These volume feeders, and many others like them, rely essentially on the skill and experience of their own purchasing personnel to solve many of the problems related to buying large quantities of food. But they also make use of the specialized skill and experience of USDA experts in various food areas to help solve other problems which are not easy to cope with on an individual basis.

(Mr. Filippone is a writer-editor in the Marketing Information Division of the Agricultural Marketing Service. Mr. Killikelly is Chief, Northeast Area, Marketing Information Division, AMS.)

An American oil company specifies food capable of a long shelf life and meat with little fat for its 15,000 employees in Saudi Arabia.



The Market Quality Research Division and the Transportation and Facilities Research Division are being transferred from the Agricultural Marketing Service to the Agricultural Research Service effective July 1, 1964. Articles in this issue referring to the work of those divisions were written before announcement of the transfer.

A Consumer's Guide to USDA Services

"A Consumer's Guide to USDA Services," a new publication summarizing for the first time in one bulletin all consumer services and safeguards provided by the U. S. Department of Agriculture, was announced recently by Secretary of Agriculture Orville L. Freeman.

"Through its research, education, and action programs, the Department of Agriculture serves every American in more than 50 major areas almost every day," Secretary Freeman said. "This new booklet is part of a major effort to enable all consumers to make better use of the wide-ranging services available from the Department."

The new guide gives helpful ideas on food shopping, including information on U. S. food grades, inspection, school lunches, plentiful foods, and food for civil defense emergency. It also covers cooking, nutrition, clothing and fabrics, buying and managing a home, kitchen planning, pest control, gardening, lawn care, recreation, family finance, and meeting emergencies.

Included in the 50-page guide is a list of more than 100 USDA publications which give more details on subjects discussed in the Guide.

Single copies of "A Consumer's Guide to USDA Services," MP 959, also are available by post card request to the Office of Information, U.S. Department of Agriculture, Washington, D. C. 20250.